

# TABLE OF CONTENTS

<b>Chapter No.</b>	<b>Description</b>	<b>Page No.</b>
	CERTIFICATE	(ii)
	DECLARATION BY THE CANDIDATE	(iii)
	COPYRIGHT TRANSFER CERTIFICATE	(iv)
	DEDICATION	(v)
	ACKNOWLEDGEMENTS	(vi)
	TABLE OF CONTENTS	(ix)
	LIST OF FIGURES	(xii)
	LIST OF TABLES	(xv)
	LIST OF ABBREVIATIONS	(xvi)
	PREFACE	(xviii)
<b>1</b>	<b>Introduction</b>	<b>01</b>
1.1	General	01
1.2	Configuration of FRP Laminates	02
1.3	Need of the Study	03
1.4	Organization of Thesis	04
<b>2.</b>	<b>Literature Review</b>	<b>07</b>
2.1	Method for Buckling Analysis of Composite Structure	07
2.1.1	Application of Analytical Method	08
2.1.2	Experimental and Computational Method	11
2.1.3	Application of Finite Element Method	15
2.1.4	Development of other methods	22
2.2	Research Gaps in the Study	31
2.3	Research Objectives	32
<b>3.</b>	<b>Numerical Studies on Thin Wall Laminated Composite Hat-Stiffened Panels under edge Compression Load</b>	<b>33</b>
3.1	Introduction	33

3.2	FE Modeling of Laminated Composite Hat-Stiffened Panels	36
3.2.1	Mathematical Formulation	36
3.2.2	FE Modeling in ABAQUS	38
3.2.3	Validation Studies	39
3.3	Numerical Studies of the Panel	40
3.3.1	The Parameters	42
3.4	Results and Discussion	51
3.4.1	Influence of the Panel Orthotropy Ratio	52
3.4.2	Influence of Smeared Extensional Stiffness Ratio of Stiffeners to that of Skin	52
3.5	Summary	59
4.	<b>The Prediction of Buckling Load of Laminated Composite Hat-Stiffened Panels under edge Compression Load by using of Neural Networks</b>	61
4.1	Introduction	61
4.2	FE Modeling of the Laminated Composite Panels	63
4.2.1	Numerical studies of the Hat-Stiffened Panel	65
4.3	Methodology for Prediction of Buckling Load by ANN	67
4.3.1	Selection of Training and Testing Data from the Main Data-Sheet	68
4.3.2	Deciding the Network Type and other Required Parameters	68
4.3.3	Training the Network and Simulation	70
4.3.4	Evaluation of the Performance of ANN	72
4.4	Results and Discussion	72
4.5	Summary and Conclusions	80
5	<b>Experimental and FE Analysis for the Post-Buckling Behaviour of Hat-Stiffened Panels under edge Compression Load</b>	81
5.1	Introduction	81
5.2	Configurations of Stiffened Composite Panel	83
5.3	Experimental Set Up	85

5.4	Experimental Results	88
5.5	Non-linear Finite Element Analysis	95
5.6	Summary	99
6	<b>Conclusions and Scope of Future Work</b>	101
6.1	Conclusions	101
6.2	Scopes of Future Work	103
	References	105
	List of Publications	116
	Appendix-A	117